

cut at frequent intervals by side canyons, some of which extend with sheer walls to the nearly or quite precipitous outer rim of the main canyon. The higher parts of the Coconino Plateau along Grand Canyon are unsuited to the needs of antelope squirrels and the side canyons mentioned, while not absolute barriers at their heads, evidently tend to break the continuity of range within the main canyon.

Specimens from Indian Gardens, on the broad terrace along the inner gorge at 3,800 feet altitude on the south side near the end of the Grand Canyon Railroad, are darker and richer in color than typical *A. l. cinnamomeus* and may be grading toward the form here described, but in cranial characters agree with the former. Some specimens from localities in northwestern Arizona, north of the Grand Canyon are similar to the Prospect Valley animal in cranial details and are not widely different in color, but are evidently more nearly intermediate between *A. l. leucurus* and *A. l. cinnamomeus*. The restricted range of *A. l. tersus* is closely approached on the west, beyond the Grand Wash Cliffs, by the wide distribution area of *Ammospermophilus harrisi*, a related but apparently quite distinct species. The narrow gap between the known ranges of the two has not been thoroughly explored, but appears to be a barrier formed by high spurs of the plateau, extending to sheer or uninhabitable canyon walls.

Specimens examined.—Ten, all from the type locality.

ZOOLOGY.—*Neoapectana glaseri*, *n.g.*, *n.sp.* (*Oxyuridae*), a new nematoc parasite of the Japanese beetle (*Popillia japonica* Newm.).¹
G. STEINER, Office of Nematology, Bureau of Plant Industry.

In a lot of fourteen dead larvae of the Japanese beetle² submitted to him for a diagnosis as to the cause of the death, Dr. R. W. Glaser of the Rockefeller Institute for Medical Research at Princeton, N. J. found thousands of nemas. These were sent to the writer for identification.

The form seems to be new, belonging not only to a new species but also to a new Oxyurid genus exhibiting close relationship to the genera *Aplectana* and *Steinernema*. The present paper deals only with the description of the new form; the life cycle and economic significance of the parasite will be studied by Dr. Glaser himself. It is the first time, so far as we know, that a nema has been observed parasitizing the Japanese beetle. The question as to the origin of this parasite also is of interest. Is it a native of Japan? Was it brought to this coun-

¹ Received October 9, 1929.

² Kindly sent by Dr. HENRY FOX, of the U. S. Japanese Beetle Laboratory at Moorestown, N. J.

try with the first immigrating Japanese beetle, or did it come later with the introduction of some other parasites of its host in an accidental way? This is not known. Another possibility is that the parasite has as an original host some native insect or insects, and adapted itself only recently to the Japanese beetle. It would be strange if this parasite had in the past escaped the efforts of the numerous entomologists studying that insect, and has only now come to their attention. The view that we have here a case of an attack of some native parasite on the immigrant therefore seems more probable. Dr. Glaser states that the larvae of the beetle were swarming with specimens of the parasite, larvae as well as adult males and females.

Neoapectana glaseri, n. g., n. sp.

The larval *Neoapectanas* are very slender, in a less degree also the males, but the females are thick and plump. The tail end of the larva is long-conical and sharply pointed (Fig. F); that of the female, however, is short-conical with a blunt end (Fig. G). The tail of the male is different, being broad-obtuse (Figs. H and I). The cuticle is thin, not annulated and not striated. There are no lateral wings, a character which differentiates this genus from *Apectana* (Railliet et Henry, 1916). No deirids but phasmids were seen. The head is not set off. There are three indistinct lips; each of them has two protruding papillae, all together forming an anterior or labial circle of papillae. Back of them, however, is a second circle of papillae,—the cephalic papillae,—which do not protrude. They are difficult to see in a side view, and are best located in a front view. The amphids are perhaps the most noticeable organs of the head end. They are shifted dorsad to the same level with the lateral papillae. The amphidial pouch is a slightly conical tube (Fig. B); terminals were seen but their number could not be made out. Two short setae were seen ventro-submedial, one on each side at about the level of the cephalic papillae. Their significance is unknown (Fig. E). There is no buccal cavity. The anterior part of the oesophagus is cylindroid; a faint isthmus connects with the terminal bulb. At the anterior end of the oesophagus the outlets of three salivary glands were seen. The terminal bulb is rather weak and the ribbed valvulae are indistinct. The intestine consists of a single layer of flat cells. In the larvae, these are filled with granules, except three or four cells just following the oesophageal bulb. In the adult, however, the intestine seems degenerate. The nerve-ring circles the oesophagus in front of the terminal bulb. The excretory pore opens ventrad of the nerve-ring. The female sexual apparatus is amphidelph (Seurat 1920). The ovaries are apparently reflexed. The uterus extends far forward and backward, often reaching and even passing the terminal bulb of the oesoph-

agus. Larvae and eggs in all different stages of cleavage are seen simultaneously in the uterus. Perhaps the present species represents a case closely approaching what Seurat (1920) terms "endothokis matricide." It is very probable that most of the larvae hatch only after the mother is dead. The male has a single testis, stretched out forward but ending some distance behind the beginning of the intestine. The entire male apparatus has a right lateral position. Only the end portion of the ductus ejaculatorius lies ventrad. The spicula are large and arcuate, the distal end is slightly cephalated and forms a hook; the gubernaculum is large, its distal part lineate, the proximal, however, broadly swollen (Fig. H). The arrangement of the muscles of the male apparatus may be seen in Fig. H. The number of the protruding and nipple-shaped copulatory papillae is large. There are postanal and preanal papillae. There is a single preanal ventro-medial papilla some distance in front of the anus. A series of seven ventro-submedial papillae, beginning at the anus, extends about three and one-half times the length of the spicula in front of it; a single lateral papilla is located just in front of the anus. On the tail there are always two ventro-submedial papillae close to the end and a dorso-submedial one in the same region; in some specimens one or two additional ventro-submedial papillae were seen.

It will be noted from this description that the present form exhibits a close relationship to *Steinernema kraussei* (*Aplectana kraussei* Steiner 1923). The general shape of the body, but especially the spicula and the gubernaculum, are almost the same, yet the number and arrangement of the head sense organs are very different, *Steinernema* having but a single circle of four submedial papillae, whereas *Neoaplectana* has two circles of six each. In addition, the number of male copulatory papillae is much larger in *Neoaplectana* and their arrangement is very different. *Aplectana*, on the other hand, has lateral wings and a pointed tail end in the male, characters in which it differs from the present genus.

Neoaplectana belongs ecologically, probably, to a group of nemas, the hosts of which are insects that pass at least part of their life in the soil.

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- A. Anterior end. *p ex*, excretory pore; *valv*, valvula of terminal bulb. About 533×.
- B. Sketch of the amphid. *amph gl*, amphidial gland; *amph p*, amphidial pouch; *term*, terminals.
- C, D. Formed contents as seen in the intestine.
- E. Front view of head end. *amph*, amphid; *dors subm lab pap*, dorso-submedial labial papilla; *lat cep pap*, lateral cephalic papilla; *seta*, seta of unknown significance. About 1090×.
- F. Tail end of larva. *phas*, phasmid. About 120×.
- G. Tail end of adult female. About 120×.
- H. Tail end of male. 1-14, various papillae; *brs msc*, bursal muscles; *duct ej*, ductus ejaculatorius; *prot gub*, protractor gubernaculi; *prot sp*, protractor spiculi; *retr gub*, retractor gubernaculi; *retr sp*, retractor spiculi. About 485×.
- I. Tail end of male, ventral view. About 533×.

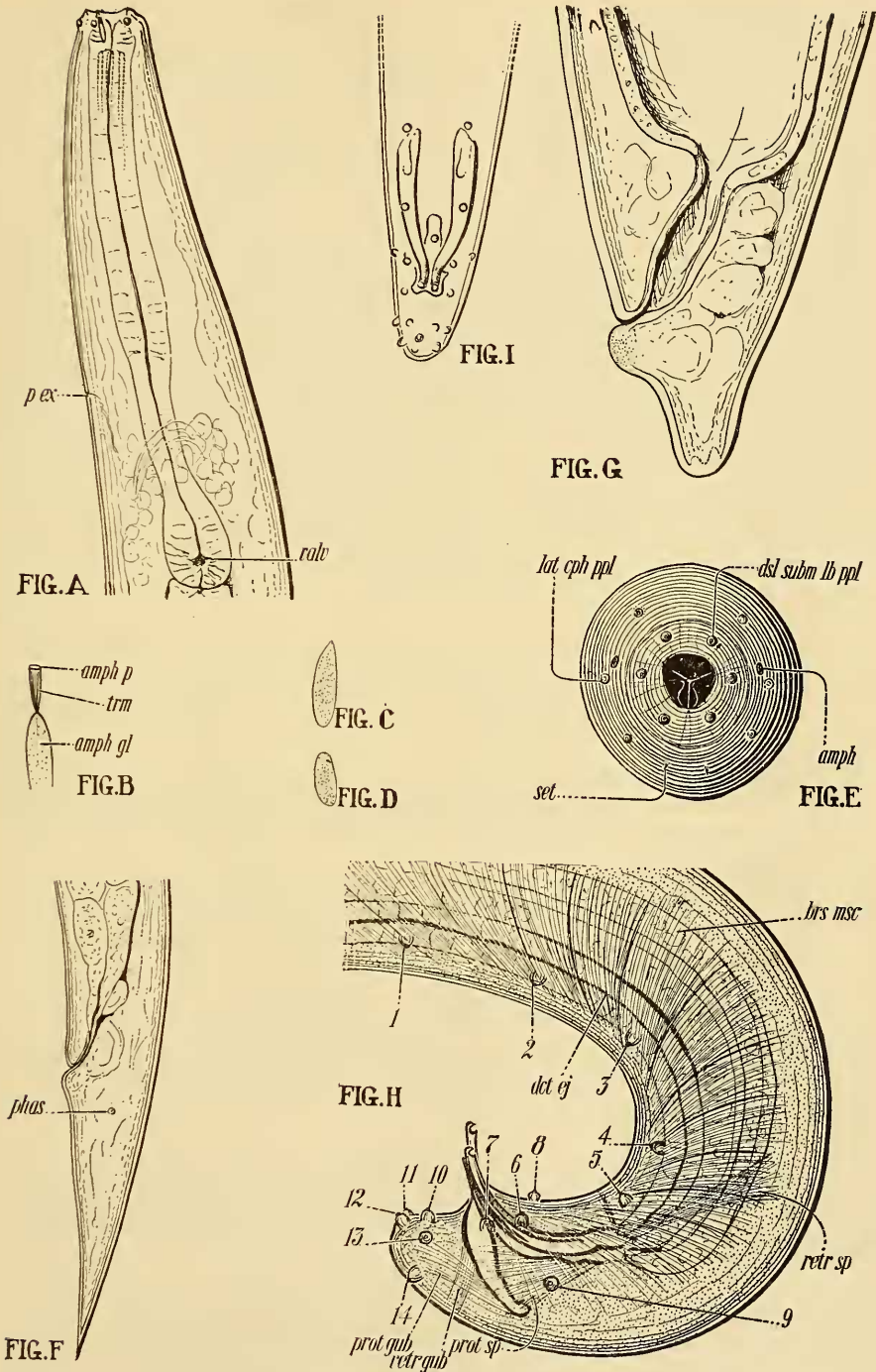


Figure 1.—*Neoplectana glaseri*, n. g., n. sp.

Measurements:

?	Nerve-ring 2.3	Oesophagus 3.9	Vulva 45—51.5—44	98.8	4.7 mm.
?	1.8	2.2	4.4	1.4	
?	9.5	16.7	—M	96.7	1.4 mm
?	4.4	5.3	6.6	4.4	

Diagnosis of the genus. Oxyuridae without lateral wings, with three lips, six labial and six cephalic papillae; amphids shifted dorsad and forward to about the same level with the cephalic papillae. No bucal cavity, no mouth armature, oesophagus with slight isthmus in front of terminal bulb; the latter with vestigial valvulae; vulva in about the middle of the body; female apparatus amphidelph; male tail short, bluntly rounded; testis single; spicula symmetrical; gubernaculum single, large; numerous nipple-shaped preanal and postanal papillae in ventro-medial, ventro-submedial, lateral and dorso-submedial position.

Diagnosis of the new species. *Neoaplectana* with the characters of the genus; male with a single medial preanal papilla and with 11–13 ventro-submedial, lateral and dorso-submedial papillae on each side, as shown at H.

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SCIENTIFIC NOTES AND NEWS

Dr. RAY S. BASSLER has been appointed Head Curator of the Department of Geology in the U. S. National Museum to succeed the late Dr. George P. Merrill. Dr. Bassler has been connected with the Division of Paleontology of the Museum since 1901.

Dr. WILLIAM F. FOSHAG has been made Curator of the Division of Mineralogy and Petrology in the U. S. National Museum. Under this division is now included the former Divisions of Physical and Chemical Geology and of Mineralogy and Petrology.

Dr. C. E. RESSER, of the U. S. National Museum, has returned from a three months' field trip, mostly in the Rocky Mountains of Montana. Good collections of fossils and important stratigraphic information were obtained in furtherance of his studies on the lower Paleozoic formations.